

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

Claim 1 (Original): Method for categorizing a portion of a video frame, comprising:
using texture information in the portion to determine whether the portion comprises at most a predetermined amount of spatial information; and
if the texture information indicates that the portion comprises at most the predetermined amount of spatial information, then categorizing the portion as nonpredictive.

Claim 2 (Original): The method of Claim 1, wherein the texture information comprises texture bits.

Claim 3 (Currently Amended): The method of Claim 1, further comprising calculating a variance value of the portion of the video frame to generate ~~wherein variance values of the portion of the video frame are used to determine~~ the texture information.

Claim 4 (Currently Amended): The method of Claim 3, wherein the predetermined amount of spatial information is an average variance value of at least one other ~~another~~ video frame, the method further comprising:

comparing the calculated variance value of the portion of the video frame to the average variance value of the at least one other video frame; and

if the variance value of the portion is less than the average variance value of the at least one other video frame, categorizing the portion as nonpredictive.

Claim 5 (Currently Amended): The method of Claim 4 ~~[[3]]~~, wherein the average variance value ~~predetermined amount of spatial information~~ is a scaled average variance value of at least one other ~~another~~ video frame.

Claim 6 (Original): Method for categorizing a portion of a video frame, comprising:
 using texture information in the portion to determine whether the portion comprises at most a predetermined amount of spatial information;
 if the texture information indicates that the portion comprises at most the predetermined amount of spatial information, then categorizing the portion as nonpredictive;
 if the texture information indicates that the portion does not comprise at most a predetermined amount of spatial information, then:
 performing a motion estimation search;
 using motion information determined during the motion estimation search to determine whether the portion comprises at least a predetermined amount of predictive information;
 if the motion information indicates that the portion comprises at least the predetermined amount of predictive information, then categorizing the portion as predictive; and
 if the motion information indicates that the portion does not comprise at least the predetermined amount of predictive information, then categorizing the portion as nonpredictive.

Claim 7 (Original): The method of Claim 6, wherein the texture information comprises texture bits.

Claim 8 (Currently Amended): The method of Claim 6, further comprising calculating a variance value of the portion of the video frame to generate ~~wherein variance values of the portion of the video frame are used to determine~~ the texture information.

Claim 9 (Currently Amended): The method of Claim 8, wherein the predetermined amount of spatial information is an average variance value of at least one other ~~another~~ video frame, the method further comprising:

comparing the calculated variance value of the portion of the video frame to the average variance value of the at least one other video frame; and

if the variance value of the portion is less than the average variance value of the at least one other video frame, categorizing the portion as nonpredictive.

Claim 10 (Currently Amended): The method of Claim 8 ~~[[9]]~~, wherein the average variance value ~~predetermined amount of spatial information~~ is a scaled average variance value of at least one other ~~another~~ video frame.

Claim 11 (Currently Amended): The method of Claim 6, wherein motion information comprises pixel differences between the portion of the video frame and at least a ~~another~~ portion of at least one other ~~another~~ video frame.

Claim 12 (Currently Amended): Method for selectively encoding a current macroblock using nonpredictive encoding or predictive encoding, comprising:

using texture information of the current macroblock to determine whether to nonpredictively encode the current macroblock; and

upon determining not to nonpredictively encode the current macroblock based on the texture information, using motion information of the current macroblock to determine whether to predictively encode the current macroblock.

Claim 13 (Original): The method of Claim 12, wherein using texture information of the current macroblock to determine whether to nonpredictively encode the current macroblock comprises:

determining a variance value of the current macroblock;

comparing the variance value of the current macroblock to a scaled variance value of a macroblock from at least one other video frame; and

if the variance value of the current macroblock is less than the scaled variance value of the macroblock from at least one other video frame, then determining to nonpredictively encode the current macroblock.

Claim 14 (Original): The method of Claim 13, wherein the scaled variance value of the macroblock from at least one other video frame is a scaled average variance.

Claim 15 (Currently Amended): The method of Claim 12, wherein using motion information of the current macroblock to determine whether to predictively encode the current macroblock comprises:

determining pixel differences between the current macroblock and a macroblock from another video frame; and

if the pixel differences between the current macroblock and the macroblock from another video frame is less than a configurable threshold value, then determining to predictively encode the current macroblock ~~with enhanced accuracy~~.

Claim 16 (Currently Amended): The method of Claim 12, wherein using motion information of the current macroblock to determine whether to predictively encode the current macroblock comprises:

determining a sum of absolute distance values between the current macroblock and macroblocks from at least one other video frame; and

if the sum of absolute distance values is less than a scaled average minimum sum of absolute distance values of macroblocks from at least one other video frame, then determining predictively encode the current macroblock ~~with enhanced accuracy~~.

Claim 17 (Original): The method of Claim 16, wherein the scaled average minimum sum of absolute distance values is configurable.

Claim 18 (Currently Amended): Method for selectively reducing processing cycles of a video codec, comprising:

receiving a configuration signal; and

configuring at least one variable within a complexity control algorithm in accordance with the configuration signal, wherein complexity control algorithm categorizes portions of a predictive video frame as nonpredictive portions when texture information of the portions indicates there is less than or equal to a predetermined amount of spatial information and configuring the at least one variable of the complexity control algorithm increases is for selectively increasing the number of portions in the predictive video frame characterized as nonpredictively encoded portions of a predictive video frame based upon the texture information.

Claim 19 (Original): The method of Claim 18, wherein the configuration signal conveys image size information.

Claim 20 (Original): The method of Claim 18, wherein the configuration signal conveys transmission frame rate information.

Claim 21 (Original): The method of Claim 18, wherein the configuration signal conveys a user command.

Claim 22 (Original): The method of Claim 18, wherein the configuration signal conveys information regarding available hardware resources.

Claim 23 (Currently Amended): Apparatus for selectively reducing the processing cycles of a video codec, comprising:

a first complexity control element configured to use texture information of a current macroblock to determine whether to nonpredictively encode the current macroblock; and

a second complexity control element configured to, upon determining not to nonpredictively encode the current macroblock based on the texture information, use motion information of the current macroblock to determine whether to predictively encode the current macroblock.

Claim 24 (Currently Amended): Apparatus for selectively reducing processing cycles of a video codec, comprising:

a complexity control element configured to receive a configuration signal and to configure at least one variable within a complexity control algorithm in accordance with the configuration signal, wherein the complexity control algorithm categorizes portions of a predictive video frame as nonpredictive portions when texture information of the portions indicates there is less than or equal to a predetermined amount of spatial information and configuring the at least one variable of the complexity control algorithm increases ~~is for selectively increasing the number of portions in the predictive video frame characterized as nonpredictively encoded portions of a predictive video frame based upon the texture information.~~

Claim 25 (Currently Amended): Apparatus for categorizing a portion of a video frame, comprising:

at least one memory element; and

at least one processing element configured to execute a set of instructions stored ~~stores~~ in the at least one memory element, the set of instructions for:

using texture information in the portion to determine whether the portion comprises at most a predetermined amount of spatial information;

if the texture information indicates that the portion comprises at most the predetermined amount of spatial information, then categorizing the portion as nonpredictive;

if the texture information indicates that the portion does not comprise at most a predetermined amount of spatial information, then:

performing a motion estimation search;

using motion information determined during the motion estimation search to determine whether the portion comprises at least a predetermined amount of predictive information;

if the motion information indicates that the portion comprises at least the predetermined amount of predictive information, then categorizing the portion as predictive; and

if the motion information indicates that the portion does not comprise at least the predetermined amount of predictive information, then categorizing the portion as nonpredictive.

Claim 26 (Currently Amended): Apparatus for selectively encoding a current macroblock using nonpredictive encoding or predictive encoding, comprising:

means for using texture information of the current macroblock to determine whether to nonpredictively encode the current macroblock; and

means for using motion information of the current macroblock to determine whether to predictively encode the current macroblock upon determining not to nonpredictively encode the current macroblock based on the texture information.

Claim 27 (Currently Amended): Apparatus for selectively reducing processing cycles of a video codec, comprising:

means for receiving a configuration signal; and

means for configuring at least one variable within a complexity control algorithm in accordance with the configuration signal, complexity control algorithm categorizes portions of a predictive video frame as nonpredictive portions when texture information of the portions indicates there is less than or equal to a predetermined amount of spatial information and configuring the at least one variable of the complexity control algorithm increases is for selectively increasing the number of portions in the predictive video frame characterized as nonpredictively encoded portions of a predictive video frame based upon the texture information.

Claim 28 (Currently Amended): Apparatus for categorizing a portion of a video frame, comprising:

means for using texture information in the portion to determine whether the portion comprises at most a predetermined amount of spatial information, and

means for categorizing the portion as nonpredictive if the texture information indicates that the portion comprises at most the predetermined amount of spatial information.

Claim 29 (New): The apparatus of Claim 28, further comprising means for calculating a variance value of the portion of the video frame to generate the texture information.

Claim 30 (New): The apparatus of Claim 29, wherein the predetermined amount of spatial information is an average variance value of at least one other video frame, the apparatus further comprising:

means for comparing the calculated variance value of the portion of the video frame to the average variance value of the at least one other video frame; and wherein

the categorizing means categorizes the portion as nonpredictive if the variance value of the portion is less than the average variance value of the at least one other video frame.

Claim 31 (New): The method of Claim 6, further comprising determining, when the portion is categorized as predictive, whether to perform fractional-pixel motion estimation based on a quality metric associated with the portion.

Claim 32 (New): The method of Claim 31, wherein the quality metric comprises a sum of absolute difference (SAD) between pixel values of the portion and pixel values of a portion of at least one other video frame, the method further comprising:

comparing SAD to a threshold SAD value; and

performing fractional-pixel motion estimation when the SAD is less than the threshold SAD value; and

bypassing the fractional-pixel motion estimation when the SAD is greater than or equal to the threshold SAD value.

Claim 33 (New): The method of Claim 18, wherein configuring at least one variable within a complexity control algorithm further comprises adjusting the predetermined amount of spatial information.

Claim 34 (New): The method of Claim 18, wherein receiving a configuration signal comprises receive a configuration signal that originates from a network.

Claim 35 (New): The apparatus of Claim 23, wherein the first complexity control element determines a variance value of the current macroblock, compares the variance value of the current macroblock to a scaled variance value of a macroblock from at least one other video frame, and determines to nonpredictively encode the current macroblock if the variance value of the current macroblock is less than the scaled variance value of the macroblock from at least one other video frame.

Claim 36 (New): The apparatus of Claim 23, wherein the second complexity control element determines pixel differences between the current macroblock and a macroblock from another video frame and determines to predictively encode the current macroblock with fractional-pixel motion estimation if the pixel differences between the current macroblock and the macroblock from another video frame is less than a configurable threshold value.

Claim 37 (New): The apparatus of Claim 23, wherein the second complexity control element determines a sum of absolute distance values between the current macroblock and macroblocks from at least one other video frame and determines to predictively encode the current macroblock with fractional-pixel motion estimation if the sum of absolute distance values is less than a scaled average minimum sum of absolute distance values of macroblocks from at least one other video frame

Claim 38 (New): The apparatus of Claim 37, wherein the scaled average minimum sum of absolute distance values is configurable.

Claim 39 (New): The apparatus of Claim 24, wherein the configuration signal conveys one of image size information, transmission frame rate information, a user command, and information regarding available hardware resources.

Claim 40 (New): The apparatus of Claim 24, wherein configuring at least one variable within a complexity control algorithm further comprises adjusting the predetermined amount of spatial information.

Claim 41 (New): The apparatus of Claim 24, wherein receiving a configuration signal comprises receive a configuration signal that originates from a network.

Claim 42 (New): The apparatus of Claim 25, wherein the processing element:
calculates a variance value of the portion of the video frame to generate the texture information;
compares the calculated variance value of the portion of the video frame to an average variance value of at least one other video frame; and
if the variance value of the portion is less than the average variance value of the at least one other video frame, categorizes the portion as nonpredictive.

Claim 43 (New): The apparatus of Claim 25, wherein motion information comprises pixel differences between the portion of the video frame and at least a portion of at least one other video frame.

Claim 44 (New): The apparatus of Claim 25, wherein the processing element determines, when the portion is categorized as predictive, whether to perform fractional-pixel motion estimation based on a quality metric associated with the portion.

Claim 45 (New): The apparatus of Claim 44, wherein the quality metric comprises a sum of absolute difference (SAD) between pixel values of the portion and pixel values of a portion of at least one other video frame, and the processing element:
compares SAD to a threshold SAD value; and
performs fractional-pixel motion estimation when the SAD is less than the threshold SAD value; and

bypasses the fractional-pixel motion estimation when the SAD is greater than or equal to the threshold SAD value.

Claim 46 (New): An apparatus for categorizing a portion of a video frame comprising a processing element configured to:

use texture information in the portion to determine whether the portion comprises at most a predetermined amount of spatial information; and

categorize the portion as nonpredictive if the texture information indicates that the portion comprises at most the predetermined amount of spatial information.

Claim 47 (New): The apparatus of Claim 46, wherein the processing element is further configured to calculate a variance value of the portion of the video frame to generate the texture information.

Claim 48 (New): The apparatus of Claim 47, wherein the predetermined amount of spatial information is an average variance value of at least one other video frame and the processing element is further configured to:

compare the calculated variance value of the portion of the video frame to the average variance value of the at least one other video frame; and wherein

categorize the portion as nonpredictive if the variance value of the portion is less than the average variance value of the at least one other video frame.

Claim 49 (New): An apparatus for categorizing a portion of a video frame, comprising:

means for determining whether the portion comprises at most a predetermined amount of spatial information based on texture information in the portion;

means for categorizing the portion as nonpredictive if the texture information indicates that the portion comprises at most the predetermined amount of spatial information;

means for performing a motion estimation search if the texture information indicates that the portion does not comprise at most a predetermined amount of spatial information;

means for determining whether the portion comprises at least a predetermined amount of predictive information based on motion information determined during the motion estimation search;

wherein the categorizing means categorizes the portion as predictive if the motion information indicates that the portion comprises at least the predetermined amount of predictive information and categorizes the portion as nonpredictive if the motion information indicates that the portion does not comprise at least the predetermined amount of predictive information.

Claim 50 (New): The apparatus of Claim 49, further comprising:

means for calculating a variance value of the portion of the video frame to generate the texture information; and

means for comparing the calculated variance value of the portion of the video frame to an average variance value of at least one other video frame; wherein

the categorizing means categorizes the portion as nonpredictive if the variance value of the portion is less than the average variance value of the at least one other video frame.

Claim 51 (New): The apparatus of Claim 49, further comprising means for determining whether to perform fractional-pixel motion estimation when the portion is categorized as predictive based on a quality metric associated with the portion.

Claim 52 (New): The apparatus of Claim 51, wherein the quality metric comprises a sum of absolute difference (SAD) between pixel values of the portion and pixel values of a portion of at least one other video frame, the method further comprising:

comparing SAD to a threshold SAD value; and

performing fractional-pixel motion estimation when the SAD is less than the threshold SAD value; and

bypassing the fractional-pixel motion estimation when the SAD is greater than or equal to the threshold SAD value.

Claim 53 (New): A computer-readable storage medium comprising instructions that when executed by a processor cause the processor to:

use texture information in the portion to determine whether the portion comprises at most a predetermined amount of spatial information; and

categorize the portion as nonpredictive if the texture information indicates that the portion comprises at most the predetermined amount of spatial information.

Claim 54 (New): The computer-readable storage medium of Claim 53, further comprising instructions that when executed by the processor cause the processor to calculate a variance value of the portion of the video frame to generate the texture information.

Claim 55 (New): The computer-readable storage medium of Claim 54, wherein the predetermined amount of spatial information is an average variance value of at least one other video frame, the computer-readable medium further comprising instructions that when executed by the processor cause the processor to:

compare the calculated variance value of the portion of the video frame to the average variance value of the at least one other video frame;

wherein instructions to categorize the portion of the video frame comprise instructions that cause the processor to categorize the portion as nonpredictive if the variance value of the portion is less than the average variance value of the at least one other video frame.

Claim 56 (New) The computer-readable storage medium of Claim 53, further comprising instructions that when executed by the processor cause the processor to, upon determining not to nonpredictively encode the current macroblock based on the texture information, use motion information of the current macroblock to determine whether to predictively encode the current macroblock.

Claim 57 (New): The computer-readable storage medium of Claim 56, further comprising instructions that when executed by the processor cause the processor to:

determine pixel differences between the current macroblock and a macroblock from another video frame; and

if the pixel differences between the current macroblock and the macroblock from another video frame is less than a configurable threshold value, then determine to predictively encode the current macroblock.

Claim 58 (New): The computer-readable storage medium of Claim 56, further comprising instructions that when executed by the processor cause the processor to:

determine a sum of absolute distance values between the current macroblock and macroblocks from at least one other video frame; and

if the sum of absolute distance values is less than a scaled average minimum sum of absolute distance values of macroblocks from at least one other video frame, then determine predictively encode the current macroblock.

Claim 59 (New): A computer-readable storage medium comprising instructions that when executed by a processor cause the processor to:

use texture information in the portion to determine whether the portion comprises at most a predetermined amount of spatial information;

categorize the portion as nonpredictive if the texture information indicates that the portion comprises at most the predetermined amount of spatial information;

if the texture information indicates that the portion does not comprise at most a predetermined amount of spatial information, then:

perform a motion estimation search;

use motion information determined during the motion estimation search to determine whether the portion comprises at least a predetermined amount of predictive information;

if the motion information indicates that the portion comprises at least the predetermined amount of predictive information, then categorize the portion as predictive; and

if the motion information indicates that the portion does not comprise at least the predetermined amount of predictive information, then categorize the portion as nonpredictive.

Claim 60 (New): The computer-readable storage medium of Claim 59, further comprising instructions that cause the processor to:

calculate a variance value of the portion of the video frame to generate the texture information;

compare the calculated variance value of the portion of the video frame to an average variance value of at least one other video frame; and

if the variance value of the portion is less than the average variance value of the at least one other video frame, categorize the portion as nonpredictive.

Claim 61 (New): The computer-readable storage medium of Claim 59, wherein motion information comprises pixel differences between the portion of the video frame and at least a portion of at least one other video frame.

Claim 62 (New): A computer-readable storage medium comprising instructions that when executed by a processor cause the processor to:

receive a configuration signal; and

configure at least one variable within a complexity control algorithm in accordance with the configuration signal, wherein complexity control algorithm categorizes portions of a predictive video frame as nonpredictive portions when texture information of the portions indicates there is less than or equal to a predetermined amount of spatial information and configuring the at least one variable of the complexity control algorithm increases the number of portions in the predictive video frame characterized as nonpredictive portions based upon the texture information.

Claim 63 (New): The computer-readable storage medium of Claim 62, wherein the configuration signal conveys one of image size information, transmission frame rate information, a user command, and information regarding available hardware resources.

Claim 64 (New): The computer-readable storage medium of Claim 62, wherein instructions to cause the processor to configure at least one variable within a complexity control algorithm further comprise instructions that cause the processor to adjust the predetermined amount of spatial information.

Claim 65 (New): The computer-readable storage medium of Claim 62, wherein receiving a configuration signal comprises receive a configuration signal that originates from a network.

Claim 66 (New): The apparatus of Claim 26, wherein the means for using texture information:

determines a variance value of the current macroblock,

compares the variance value of the current macroblock to a scaled variance value of a macroblock from at least one other video frame, and

determines to nonpredictively encode the current macroblock if the variance value of the current macroblock is less than the scaled variance value of the macroblock from at least one other video frame.

Claim 67 (New): The apparatus of Claim 26, wherein the means for using the motion information:

determines pixel differences between the current macroblock and a macroblock from another video frame; and

determines to predictively encode the current macroblock with fractional-pixel motion estimation if the pixel differences between the current macroblock and the macroblock from another video frame is less than a configurable threshold value.

Claim 68 (New): The apparatus of Claim 26, wherein the means for using the motion information:

determines a sum of absolute distance values between the current macroblock and macroblocks from at least one other video frame; and

determines to predictively encode the current macroblock with fractional-pixel motion estimation if the sum of absolute distance values is less than a scaled average minimum sum of absolute distance values of macroblocks from at least one other video frame.